SFP-1 and MFP-1 PINGER

OPERATION MANUAL

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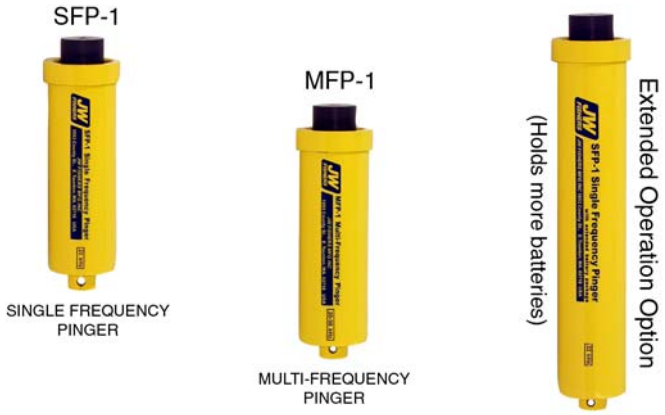

JW FISHERS MFG INC
1953 COUNTY ST.
E. TAUNTON, MA 02718 USA
(508) 822-7330; (800) 822-4744; FAX (508) 880-8949
Email: info@jwfishers.com WEB: www.jwfishers.com

SPECIFICATIONS

	SFP-I	MFP-1
• Frequency	22, 32, 40, or 50kHz	20 to 50kHz.
• Power output (adj)	.1, .5, 2, 8w	.1, .5, 2, 5w.
• Pulse length (adj)	1, 3, 5ms	2, 3, 4ms.
• Rep rate (adj)	2, 1, .5 sec	2, 1, .5 sec.
• Batteries (alkaline or lithium)	two 9 v	two 9 v.

note: extended battery option adds four more batteries.

• Battery life ..... from days to months depending on battery type and output power.

note: extended battery option yields 3 times battery life.

For both SFP-1 and MFP-1:

• Weight	20 oz air	negative 1 oz water.
• Size		2.4 in dia x 9 in long.
extended batt option	34 oz air	negative 2 oz water.
		2.4 in dia x 14 in long.

- Material ..... high impact PVC.
- Color ..... yellow.
- Depth rating ..... 1,000 feet.

OPTIONS

- Extended operating life (longer housing for extra batteries).
- Different frequencies available for SFP-1 (specify at time of order).
- Carrying case (holds two pingers).

MAINTENANCE

Your Pinger is constructed of corrosion resistant materials and was designed to be maintenance free. However, as with most diving equipment, it is recommended that it be rinsed in fresh water after use and stored in a cool, dry place.

Protect the pinger transducer. Do not toss the pinger into a box with other equipment. The transducer should be keep clean (soap and water) and protected from damage.

If the unit is disassembled, the o-ring can be lubricated with a silicon based lubricant.

When storing the pinger for more than a few weeks, the batteries should be removed from the pinger.

LIMITED WARRANTY

Your Pinger underwent constant inspection during assembly to insure many years of trouble free performance. The pinger is warranted for TWO FULL YEARS from the date of purchase. During this period your pinger will be repaired free of charge should a failure occur due to materials or workmanship under normal use.

The warranty does not cover damage due to dropping or general misuse. The warranty covers JW Fishers equipment only. JW Fishers will not be liable outside of the remedies stated above.

Should service be required, write or phone us explaining the nature of the problem, and we will provide shipping instructions. All repairs are made at our factory. Repairs by unauthorized persons may void the warranty.

RETURNING PINGER FOR REPAIR

If your pinger should need service, you can call, fax, write, or e-mail: info@jwfishers.com, phone (508) 822-7330, or fax (508) 880-8949 the factory for instructions. We do not require authorization for the return of equipment. If you have a problem with your pinger and would like to have it checked out at the factory, simply pack the pinger well and return it with a brief note describing the problem.

Be sure to include your return address and telephone number on the note. When returning equipment from outside of the US, to avoid Custom problems when arriving in the USA, contact the factory for specific instructions regarding shipping.

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CAUTIONS:

Do not allow the Pinger to be exposed to excessive heat by leaving it in direct sunlight or inside of a closed vehicle on a hot day. Excessive heat can damage the electronics and/or destroy the waterproof seals.

The Pingers signal originates from the transducer (black end) at the end of the pinger. The transducer should be kept clean (soap and water) and protected from damage. The two screw-heads, visible at the end of the transducer, should be keep free of debris. When water touches the two screw-heads, the pinger turns on (if the pinger is in water turn-on mode).

Always test pingers and pinger receivers on land or in shallow water before deploying in open water. Pingers do not broadcast signals very far through the air; however, they can be detected 5 to 10 feet away by a pinger receiver (a “clicking” noise can also be heard from the transducer.)

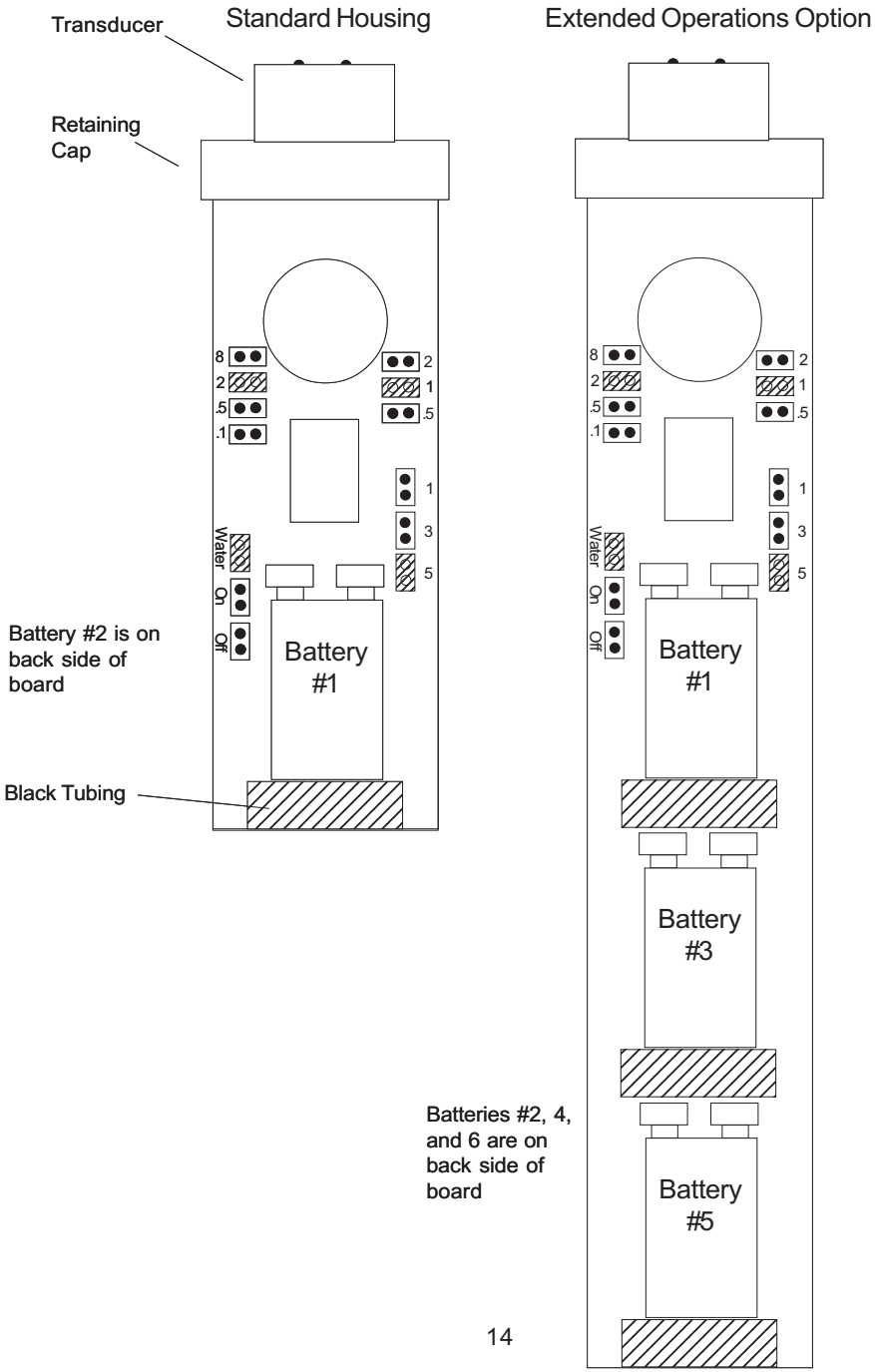
Before deploying a pinger, write down the pinger frequency for future reference (when you want to find it, you need to know the frequency.)

Before deploying a pinger in the water, be sure the electronics and seals are pushed into the pinger housing. To do this, push the end of the black transducer in the direction of the housing. Screw the cap snug, but do not overtighten.

Before swimming in the direction of a received pinger signal, always double-check other directions to insure that this direction is producing the strongest signal, and that it’s not a reflected signal (see pages 5 and 6 of this manual.)

When storing the pinger for more than a few weeks, the batteries should be removed from the pinger.

Battery Layout



ELECTRONICS BOARD REMOVAL

The electronics board is bolted to the transducer. The transducer is held in place by the Retaining Cap. Open the pinger housing by first turning the Retaining Cap counterclockwise (it should not be tight.) When the Retaining Cap is loose, pull out on the Retaining Cap and transducer which will remove the transducer and electronics board from the housing.

Note that the transducer has an o-ring (below the Retaining Cap) that seals the pinger from water. Be careful to keep this o-ring clean and free of damage. The o-ring can be lubricated with a silicon based lubricant.

When reinstalling the electronics be sure the o-ring is pushed into the pinger housing. To do this, push the end of the black transducer in the direction of the housing. Screw the Retaining Cap snug, but do not overtighten.

BATTERY INSTALLATION

The SFP-1 and the MFP-1 use two 9 volt Alkaline or Lithium batteries. The “Extended Operations Option” package uses six batteries.

To install batteries:

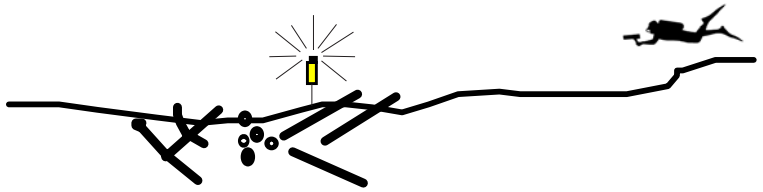
1) Remove the electronics board (see above.)

2) The batteries are mounted directly on the electronics board; one battery on each side of the board (the “Extended Operations Option” package uses three batteries on each side.) The batteries are installed “terminal end” in first (observe correct polarity.)

3) After the battery terminals are pushed in-place, push down on the other end of the battery while pushing away the black tubing to make room for the battery. It is intended to be a tight fit. The black tubing holds the battery in-place so it cannot be jarred loose. The black tubing is not used for the bottom battery on the back side of the board. This battery is held in-place by the sponge rubber in the bottom of the housing.

INTRODUCTION

Pingers are devices that generate acoustic signals underwater. They are used to mark an underwater site or piece of equipment so a returning diver, using a pinger receiver, can locate the exact spot.



Pingers are available with different transmit frequencies so several can be deployed in the same general area without interference from each other. The diver adjusts his pinger receiver to the frequency of the desired pinger and the receiver leads him to it.

DIVER WITH PINGER RECEIVER PREPARING TO DIVE TO LOCATE PINGER IN WATER.

JW Fishers family of commercial grade pingers include both the Single Frequency Pinger (SFP-1) and the Multifrequency Pinger (MFP-1). The SFP-1 is available in several frequencies one of which is specified at time of order (22, 32, 40, or 50kHz). The MFP-1 has user selectable frequencies from 20 to 50 kHz in 500 Hz increments. The operator selects one of 60 different frequencies before deploying the pinger. Many pingers can be deployed in the same general area, each transmitting at a different frequency. This enables a diver with a pinger receiver to pinpoint the exact location of each pinger without interference from the other pingers.

THE SFP-1 AND MFP-1 ARE THE SAME SIZE.

Fishers pingers have several operator adjustable features including pulse repetition rate, the length of each pulse, and the output power. The length of each pulse and output power adjustments allow the operator to adjust the distance the pingers can be detected. With the MFP-1 the transmission frequency can be selected by the operator before deployment. These features make the SFP-1 and the MFP-1 extremely versatile and the first choice for almost any application.

BOTH THE SFP-1 AND MFP-1 ARE AVAILABLE WITH A LONGER HOUSING. THE LONGER HOUSING HOLDS MORE BATTERIES FOR EXTENDED OPERATIONS.

Power for the pingers is supplied by two standard alkaline 9 volt batteries which last from a few days to many months, depending on output power and pulse selection. For long durations lithium batteries can be used. A longer housing, as shown above, is also available which holds six batteries to give 3 times the normal operating time. The pinger is automatically activated when put in the water or manually activated with a switch.

DISTANCE

How far a signal can be detected from a pinger varies greatly on water conditions. The rougher the water, the more noise there is in the water. Noise in the water makes it difficult for a receiver to pick out the signal from the background noise. Noise in the water also attenuates the pinger's signal; which shortens the distance the signal will travel. On a quiet deep water lake, a range of up to 1,500 meters would not be unusual; in shallow rough water, 150 meters may be hard to do.

Thermoclines (layers of water at different temperatures) also interfere with sound traveling through the water. When sound hits a thermocline, some of the signal bounces off the thermocline, leaving a reduced signal passing through the thermocline and on to the receiver.

Pinger frequency also effects the maximum distance a pinger signal can travel. The lower the frequency, the farther sound will travel in the water. The signal from a 20 kHz pinger will travel further than a signal from a 50 kHz pinger.

BATTERIES

JW Fishers pingers are powered by standard 9 volt batteries (square rectangular shape). Two types of batteries are recommended for use in pingers: Alkaline or Lithium. Alkaline batteries are available everywhere. Look for the word "Alkaline" printed on the battery. There are cheaper batteries available that are not Alkaline. Lithium batteries are harder to find and are expensive; however, they last twice as long as Alkaline.

The standard pinger uses two 9 volt batteries. The "Extended Operations Option" package uses six batteries which operates 3 times longer than the standard pinger. The batteries are all in parallel so you can use any number of batteries and the unit will operate. The number of batteries that are used determine how long the pinger will operate; not how much output power the pinger will produce.

BATTERY LIFE

Battery life is dependent on the settings you chose for the pinger. If you need the longest range possible then select the maximum Power Output and the longest Pulse Length; however, this results in the shortest battery life.

Single Frequency Pinger Days of Operation

(with two Alkaline batteries and a 5 ms Pulse Length)

Power Output	Watt	Days Duration		
	8 w	1	2	4
	2 w	3	6	12
	.5 w	12	22	40
	.1 w	40	75	140
		.5 sec rep rate	1 sec rep rate	2 sec rep rate

Note:
- If extended case (6 batteries) 3 times the time.
- If Lithium batteries double the times shown.
- If a 3 ms Pulse Length then 1 1/2 times the time.
- If a 1 ms Pulse Length then 3 times the time.

Multifrequency Pinger Days of Operation

(with two Alkaline batteries and a 4 ms Pulse Length)

Power Output	Watt	Days Duration		
	5 w	1	2	4
	2 w	3	6	9
	.5 w	9	14	20
	.1 w	21	24	27
		.5 sec rep rate	1 sec rep rate	2 sec rep rate

Note:
- If extended case (6 batteries) 3 times the time.
- If Lithium batteries double the times shown.
- If a 3 ms Pulse Length then 1 1/2 times the time.
- If a 2 ms Pulse Length then 2 times the time.

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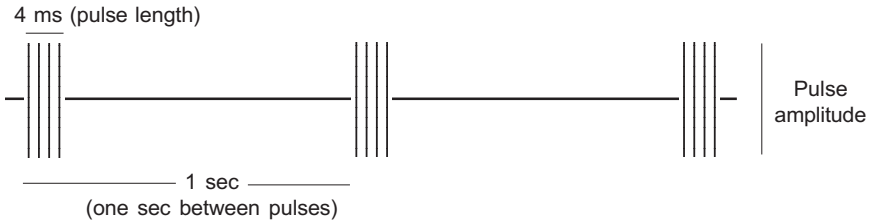
THEORY OF OPERATION

When the pinger is turned on (manually, or automatically when the pinger is put in the water) a continuous series of acoustic pulses (sound waves) are emitted from the transducer (black end) of the pinger. The pulses are of very short duration. The pulse length is measured in milliseconds (ms), and travel out from the transducer in all directions.



The operator has complete control of the output signal by “push on” jumpers on the electronics board. These jumpers are set prior to deployment of the pinger.

1) The pulse length (4 ms shown above) is operator adjustable from 1 to 5 ms (may vary with model). The longer the pulse, the further the signal will travel in the water; but the longer pulse consumes more power and shortens battery life.

2) The repetition rate (sec between pulses) is also operator adjustable from .5 sec between pulses to 2 sec between pulses (1 sec between pulses shown above). A shorter rep rate does not increase range; but it is easier to locate a pinger operating at .5 sec between pulses than one operating at two seconds between pulses. A pinger operating at .5 sec consumes twice the battery power of a pinger operating at a 1 sec rep rate.

3) Power output (pulse amplitude) is also operator adjustable from .1 to 8 watts (may vary with model). The higher the output power the farther the signal will travel through the water. Doubling the output power increases the distance; but does not double the distance. Doubling the output power reduces battery life in half.

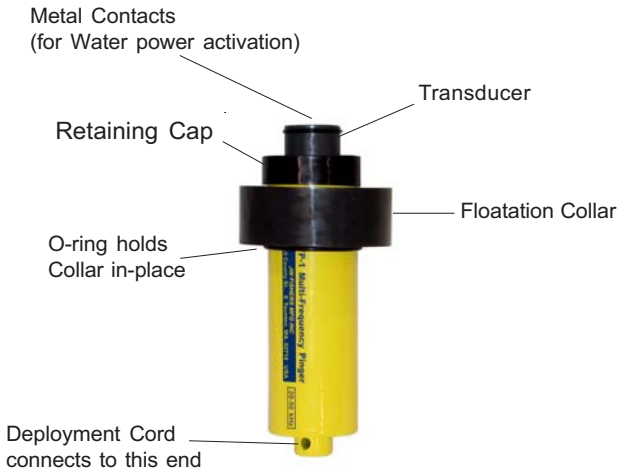
4) Frequency of the pinger (the frequency of the individual pulses within the 4 ms time frame shown above) is factory set for the Single Frequency Pinger (SFP-1) at 22, 32, 40, or 50kHz at time of order. The Multifrequency Pinger (MFP-1) is operator adjustable from 20 to 50kHz. Generally speaking, the lower the frequency of the pinger, the further the signal will travel.

5) Power activation of the pinger is operator selectable. “Off” position does not allow power to the unit. “On” position forces the unit on. “Water” position turns the unit on when the pinger enters the water (when water touches the metal contacts on top of the transducer).

If it is going to be a long term deployment the “On” position is recommended (Metal Contacts could possibly become corroded over a long term).

The signal is radiated out from the transducer end of the pinger. A floatation collar (included) is installed on the transducer end of the pinger anytime the pinger is tied to a target on the ocean floor. The floatation collar keeps the transducer end pointed up so that the radiated signal is upward as well as out to the sides.

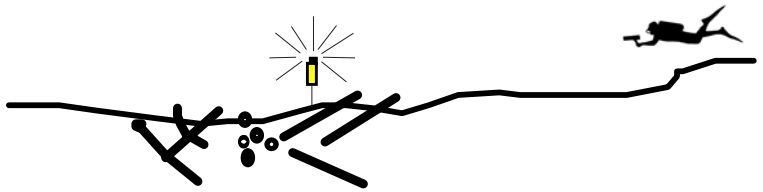
The floatation collar is not used when the pinger is tied off to a target on the surface of the water. In this situation the transducer would be pointing down (it’s natural orientation).



PINGER DEPLOYMENT

Before deploying the pinger, write down the pinger frequency for future reference (when you want to find it, you need to know the frequency.)

The transmitted signal is stronger from the top and sides of the pinger transducer than it is from the bottom. When marking a target on the ocean bottom, install the flotation collar under the Retaining Cap (to keep the transducer pointed up) and tie a cord from the bottom of the pinger to the target.



To mark an anchor line for returning divers, use the same setup as above and tie the pinger cord to the anchor line 6-10 foot up from the anchor (before deploying the anchor.)

To mark a boat or target on the surface, remove the flotation collar and tie the pinger cord to the boat (transducer will be pointed down.)

OPERATION

Pinger operation is simple and straight forward.

1) Remove the electronics board (see page 11).
2) Install “push on” jumpers (see page 6 or 7) for:
   - Power Output .... 2 watt
   - Rep Rate .... 1 Sec
   - Pulse Length .... 3 ms
   - Power Activation .... On

Sample settings shown are for moderate distances (less than 200m) and less than a week of duration.

Always test pingers and pinger receivers on land or in shallow water before deploying in open water. Pingers do not transmit signals very far through the air; however, they can be detected 5 to 10 feet away by a pinger receiver.

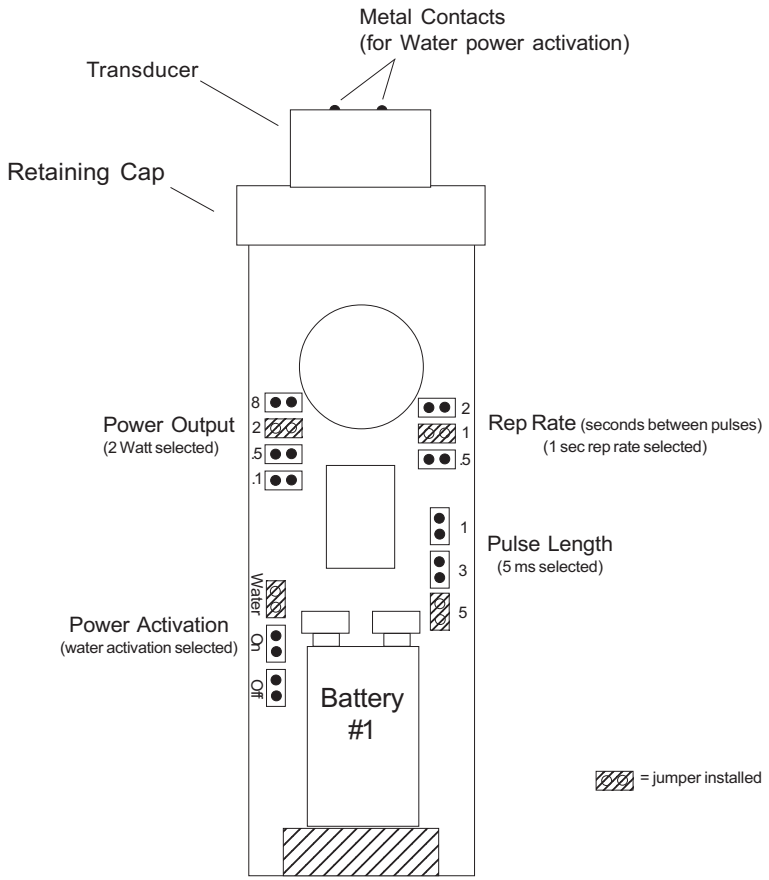
If you are operating the pinger in air, a “clicking sound” can be heard from the transducer each time a “ping” occurs. You may not be able to hear it if you have the jumpers set for a low power output.

Before deploying a pinger in the water be sure the electronics and seals are pushed into the pinger housing. To do this, push the end of the black transducer in the direction of the housing. Screw the Retaining Cap snug, but do not overtighten.

Be sure to use fresh batteries each time the pinger is used. The cost of a fresh set of batteries is small compared to the loss of a “dead” pinger, or a delay in the project while you relocate the target.

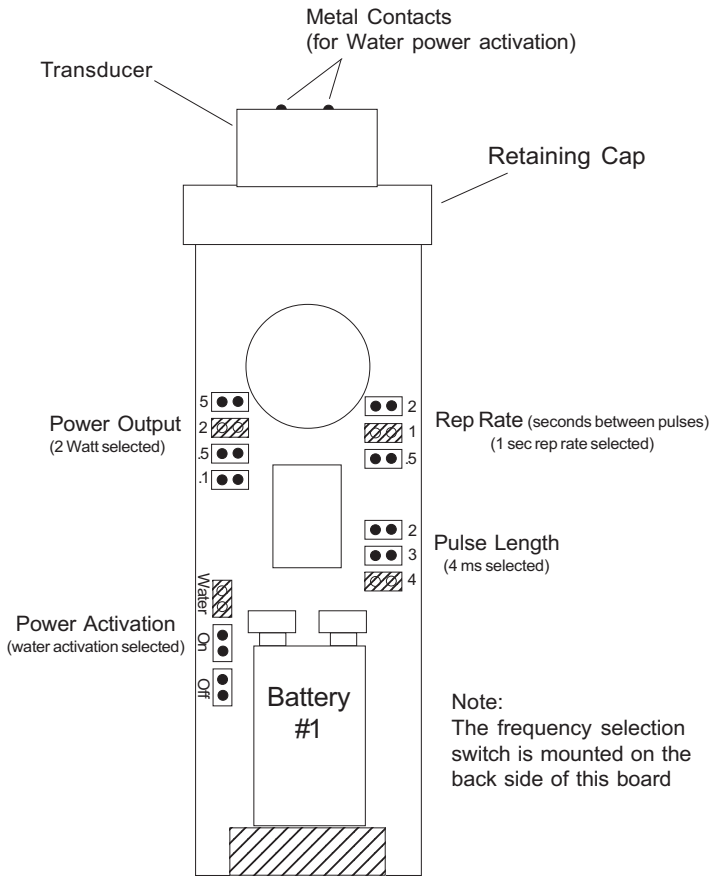
Single Frequency Pinger Jumper Layout

(Front side of board shown)



Multifrequency Pinger Jumper Layout

(Front side of board shown)



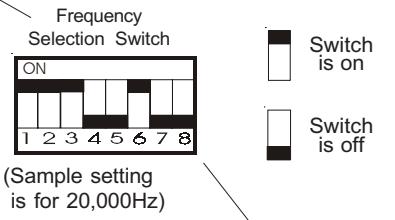
Note:
The frequency selection switch is mounted on the back side of this board

= jumper installed

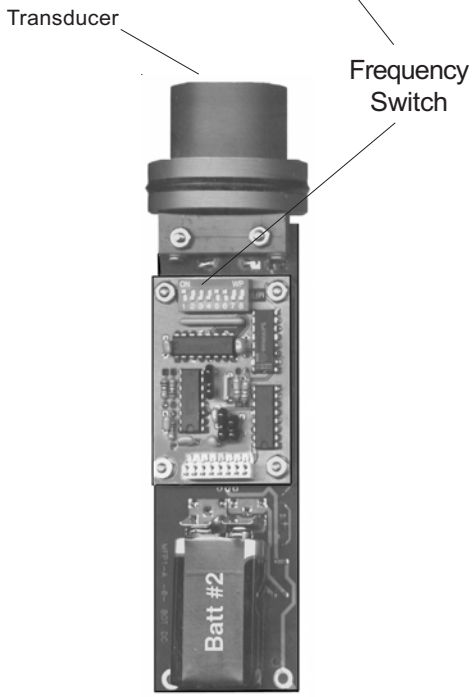
Desired Frequency	Freq Switch Settings
20000	11100100
20500	00010100
21000	10010100
21500	01010100
22000	11010100
22500	00110100
23000	10110100
23500	01110100
24000	11110100
24500	00001100
25000	10001100
25500	01001100
26000	11001100
26500	00101100
27000	10101100
27500	01101100
28000	11101100
28500	00011100
29000	10011100
29500	01011100
30000	11011100
30500	00111100
31000	10111100
31500	01111100
32000	11111100
32500	00000010
33000	10000010
33500	01000010
34000	11000010
34500	00100010
35000	10100010
35500	01100010
36000	11100010
36500	00010010
37000	10010010
37500	01010010
38000	11010010
38500	00110010
39000	10110010
39500	01110010
40000	11110010
40500	00001010
41000	10001010
41500	01001010
42000	11001010
42500	00101010
43000	10101010
43500	01101010
44000	11101010
44500	00011010
45000	10011010
45500	01011010
46000	11011010
46500	00111010
47000	10111010
47500	01111010
48000	11111010
48500	00000110
49000	10000110
49500	01000110
50000	11000110

Multifrequency Pinger

(Frequency Selection Switch)



(Sample setting
is for 20,000Hz)

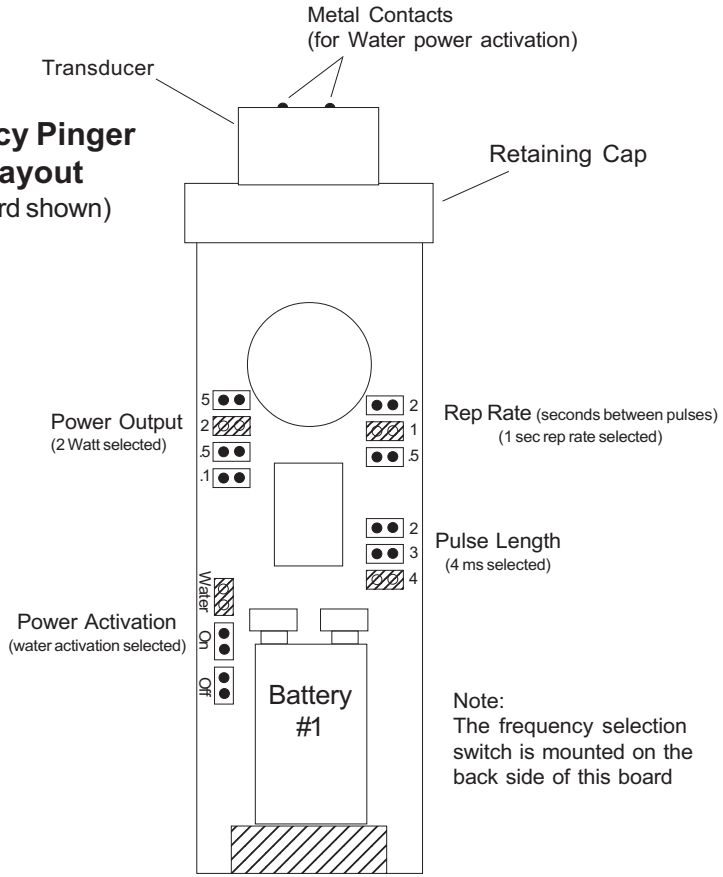


Multifrequency Pinger

(Back side of board shown)

Multifrequency Pinger Jumper Layout

(Front side of board shown)

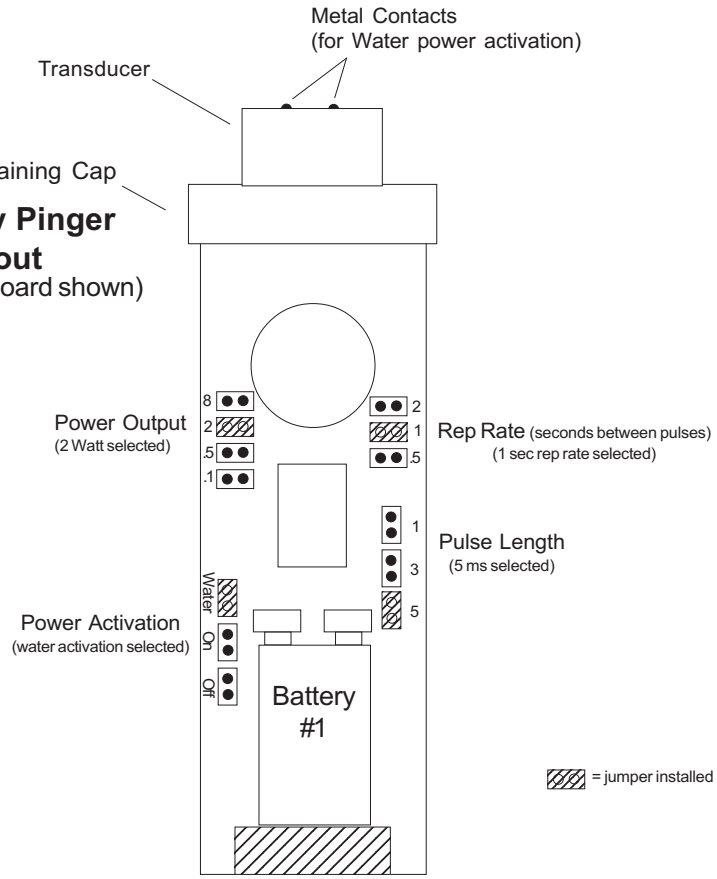


Note:
The frequency selection switch is mounted on the back side of this board

= jumper installed

Single Frequency Pinger Jumper Layout

(Front side of board shown)



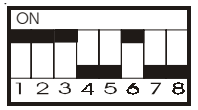
Laminate (both sides), cut on lines, and put in
Single Frequency pinger

Multifrequency Pinger

(Frequency Selection Switch)

Desired Frequency	Freq Switch Settings
20000	11100100
20500	00010100
21000	10010100
21500	01010100
22000	11010100
22500	00110100
23000	10110100
23500	01110100
24000	11110100
24500	00001100
25000	10001100
25500	01001100
26000	11001100
26500	00101100
27000	10101100
27500	01101100
28000	11101100
28500	00011100
29000	10011100
29500	01011100
30000	11011100
30500	00111100
31000	10111100
31500	01111100
32000	11111100
32500	00000010
33000	10000010
33500	01000010
34000	11000010
34500	00100010
35000	10100010
35500	01100010
36000	11100010
36500	00010010
37000	10010010
37500	01010010
38000	11010010
38500	00110010
39000	10110010
39500	01110010
40000	11110010
40500	00001010
41000	10001010
41500	01001010
42000	11001010
42500	00101010
43000	10101010
43500	01101010
44000	11101010
44500	00011010
45000	10011010
45500	01011010
46000	11011010
46500	00111010
47000	10111010
47500	01111010
48000	11111010
48500	00000110
49000	10000110
49500	01000110
50000	11000110

Frequency Selection Switch



(Sample setting is for 20,000Hz)

Switch is on

Switch is off

Laminate (both sides), cut on lines, and put in
Multifrequency pinger